

09/630595



US005817207A

United States Patent [19]

[11] Patent Number: 5,817,207

Leighton

[45] **Date of Patent:** Oct. 6, 1998

[54] RADIO FREQUENCY IDENTIFICATION CARD AND HOT LAMINATION PROCESS FOR THE MANUFACTURE OF RADIO FREQUENCY IDENTIFICATION CARDS

5,097,117	3/1992	Champagne et al. .	
5,173,840	12/1992	Kodai et al. .	
5,208,450	5/1993	Uenishi et al. .	
5,268,699	12/1993	Laute et al. .	
5,396,650	3/1995	Terauchi	455/38.2
5,412,192	5/1995	Hoss .	
5,438,750	8/1995	Venambre .	
5,567,362	10/1996	Grun .	

[76] Inventor: **Keith R. Leighton**, 2817 Fulmer Rd.,
Lorain, Ohio 44053

[21] Appl. No.: 727,789

Primary Examiner—Francis J. Lorin

[22] Filed: **Oct. 7, 1996**

Attorney, Agent, or Firm—Oldham & Oldham Co., L.P.A.

[57] **ABSTRACT**

Related U.S. Application Data

[60] Provisional application No. 60/005,685 Oct. 17, 1995.

[51] **Int. Cl.⁶** **B32B 31/20**

[52] U.S. Cl. 156/298; 156/312

[58] **Field of Search** 156/300, 312,
156/311, 298

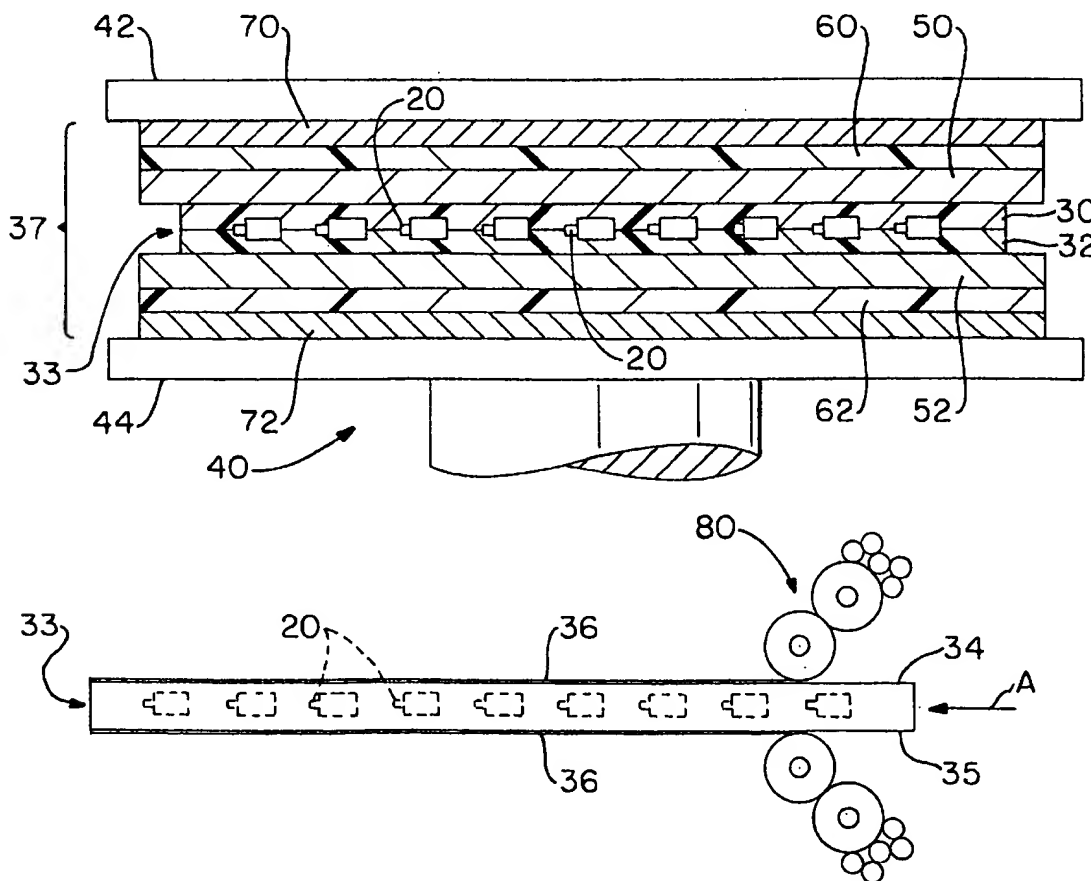
[56] **References Cited**

U.S. PATENT DOCUMENTS

4,450,024	5/1984	Haghiri-Tehrani et al.	156/108
4,701,236	10/1987	Vieilledent .	
4,792,843	12/1988	Haghiri-Tehrani et al. .	
4,795,898	1/1989	Bernstein et al. .	
4,980,802	12/1990	Champagne et al. .	
5,067,008	11/1991	Yanaka et al.	357/81

A plastic card, such as a radio frequency identification card, including at least one electronic element embedded therein and a hot lamination process for the manufacture of radio frequency identification cards and other plastic cards including a micro-chip embedded therein. The process results in a card having an overall thickness in the range of 0.028 inches to 0.032 inches with a surface suitable for receiving dye sublimation printing—the variation in card thickness across the surface is less than 0.0005 inches. A card manufactured in accordance with the present invention also complies with all industry standards and specifications. Also, the hot lamination process of the present invention results in an aesthetically pleasing card. The invention also relates to a plastic card formed in accordance with the hot lamination process of the present invention.

17 Claims, 3 Drawing Sheets



US-PAT-NO: 5817207

**DOCUMENT-
IDENTIFIER:** US 5817207 A

TITLE: Radio frequency identification card and hot lamination process for the manufacture of radio frequency identification cards

Abstract Text - ABTX (1):

A plastic card, such as a radio frequency identification card, including at least one electronic element embedded therein and a hot lamination process for the manufacture of radio frequency identification cards and other plastic cards including a micro-chip embedded therein. The process results in a card having an overall thickness in the range of 0.028 inches to 0.032 inches with a surface suitable for receiving dye sublimation printing--the variation in card thickness across the surface is less than 0.0005 inches. A card manufactured in accordance with the present invention also complies with all industry standards and specifications. Also, the hot lamination process of the present invention results in an aesthetically pleasing card. The invention also relates to a plastic card formed in accordance with the hot lamination process of the present invention.

TITLE - TI (1):

Radio frequency identification card and hot lamination process for the manufacture of radio frequency identification cards

Brief Summary Text - BSTX (3):

The present invention relates generally to plastic cards and the manufacture thereof, and more particularly to radio frequency identification (RFID) cards and the manufacture of RFID cards that conform to industry size and performance standards and conventions and that have a superior outer surface to known RFID cards such that card may receive dye sublimation printing or the like.

Brief Summary Text - BSTX (5):

As the use of plastic cards for credit cards, automated teller machine (ATM) cards, identification cards, and like continues to become more widespread, the problems associated with the use of such cards correspondingly increase. Credit card fraud and identification card fraud are becoming larger problems everyday, and this fraud has introduced uncertainties into our systems of commerce and our security systems. Using easily available technology, criminals are able to manufacture credit/debit cards, ATM cards, identification cards, and the like having another's account code, identification code, or other personal information embedded in the magnetic stripe thereof. Thus, for example, criminals may steal hundreds or thousands of legitimate credit card account numbers and manufacture many additional cards bearing the stolen information. These fraudulent cards are then usable by the criminals to purchase goods and to receive cash with the legitimate card holder and the card issuer left holding the bill. Likewise, so called debit cards are becoming increasingly popular. These cards have stored thereon a certain amount of value for which the card owner has previously paid. For example, a subway rider may purchase a card good for 50 fares, with one fare being deducted from the card each time the owner rides the subway. Criminals have also been able to manipulate the data stored on these cards to defraud the merchants and others.

Brief Summary Text - BSTX (6):

The ease in which criminals have been able to manufacture and or manipulate known cards results from the existence of the easily altered magnetic stripe storage medium used by known cards. These magnetic stripes are easily programmed and reprogrammed using commonly available technology. Thus, there has been found a need in the plastic card industry to provide a more secure plastic card that is very difficult or impossible to

fraudulently manipulate. The most likely solution to the above-noted problems associated with known plastic cards is the **RFID** card and other cards including computer chips embedded therein rather than, or in addition to, a magnetic stripe. While these **RFID** cards and like have been found to be successful in preventing or limiting fraud, they are more difficult and expensive to manufacture relative to ordinary magnetic stripe cards. One of the biggest obstacles to the wide spread manufacture and use of **RFID** cards has been the inability of card manufacturers to manufacture an **RFID** card that meets all industry standards and specifications, such as those set by the International Standards Organization (ISO), that are sufficiently aesthetically pleasing (wherein the embedded electronics are hidden from view), and that have a sufficiently regular or flat surface such that one or both surfaces of the card may be printed on using the very popular and widespread dye sublimation technology. Known plastic cards with computer chips and like embedded therein are too thick to work in connection with existing card reading machinery (ATM machines, telephones, and like) and have a surface that is too irregular to properly and consistently receive dye sublimation printing. Furthermore, prior attempts to manufacture a sufficiently thin plastic card including a computer chip embedded therein have resulted in a card with inferior aesthetic qualities such as the ability to see the embedded computer chip through the plastic.

Detailed Description Text - DETX (2):

The present invention relates to a plastic card including at least one electronic element embedded therein. The present invention also relates to a hot lamination process for the manufacture of plastic cards, and more particularly to a hot lamination process for the manufacturer of plastic cards that include an electronic element, such as a computer chip or other electronic element embedded therein. The electronic element may perform a wide variety of functions and take a wide variety of forms. Such cards, without regard to the particular electronic element embedded therein, will hereinafter be referred to as **radio frequency** identification (**RFID**) cards. The present invention also relates to a card formed in accordance with the invention.

Detailed Description Text - DETX (3):

Referring now to FIG. 1, there can be seen a plastic **RFID** card 10 manufactured in accordance with the present invention and including an electronic element 20 embedded therein. Card 10 includes an upper surface 12 and a lower surface 14. Electronic element 20 may take a wide variety of forms and perform a wide variety of functions. As shown in FIG. 3A-3C respectively, electronic element 20, 20', 20" may be provided by a micro-chip 22 including a wire antenna 24 connected thereto, a micro-chip 22' and a circuit board antenna 24', a read/write micro-chip 22" and a wire coil antenna 24", or any other suitable electronic element. These electronic elements 20, 20', 20" and their insertion into plastic cards is not new, however, the present invention provides a new hot lamination process for manufacturing plastic cards 10 with these electronic elements 20, 20', 20" embedded therein such that the cards 10 are of a superior quality, such that the cards 10 meet all ISO and other industry specifications and standards, in such that at least one of the upper and lower surfaces 12, 14 of card 10 is sufficiently smooth and is otherwise is capable of receiving dye sublimation printing. Specifically, a card in accordance with the present invention has a thickness of approximately in the range of 0.028 inches to 0.032 inches with a surface smoothness of 0.0005 inches.

US Reference Patent Number - URPN (12):

5412192